

Two New Species of *Hydrozetes*, Extant and Fossil (Acari: Cryptostigmata, Hydrozetidae)¹

TYLER A. WOOLLEY

DEPARTMENT OF ZOOLOGY
COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO 80521

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Abstract: One species, *Hydrozetes laccosis*, is described from plankton net collections from City Park Lake, Fort Collins, Colo. and is compared with European and New World forms. It has 16 pairs of notogastral setae in contrast to 17 pairs in *H. dimorphus* Hammer, 1962, 15 pairs in *H. parisiensis* Grandjean, 1948, and 11 pairs in *H. mollicoma* Hammer, 1958, *H. lemnae* (Coggi) 1898 and *H. petrunkevitchi* Newell 1945. The extant new species is shorter in length than most other species, except *lemnae*. The fossil species, *H. oryktosis*, is described from three cotype specimens extracted from peaty sediments of a mastodon site (*Mammot americanus*) in Lapeer Co., the Thumb region of Michigan: estimated age $10,750 \pm 400$ years B.P. by C-14 dating. The fossil differs from extant species in the eight pairs of genital setae and two pairs of widely spaced aggenital hairs.

The genus *Hydrozetes* originated with Berlese in his writing of 1902 wherein he redescribed *Notaspis lacustris* Michael, 1882. Chinaglia (1917) is credited with the revision of the genus which Berlese evidently completed for Chinaglia posthumously. In this writing, *H. platensis*, *H. confervae*, and *H. terrestris* are described.

In 1945, Newell reviewed the genus *Hydrozetes* mainly for species in North America and described collections of *H. lacustris* (Michael) from ponds in Connecticut. He also described a new species, *H. petrunkevitchi*, taken from various water plants at Miami, Florida. It is in this paper also that Newell describes the activity of levitation in *Hydrozetes*, a rather unique phenomenon for oribatids.

Grandjean (1948) wrote a paper on the occurrence of *Hydrozetes* in occidental Europe and described two new species, *H. parisiensis* and *H. incisus*. He also made comparisons of some of the morphological features by which species might be differentiated, as well as descriptions of the nymphs, other immature stages and their characteristics.

Hammer (1958) in her paper on the oribatids of Argentina and Bolivia describes *Hydrozetes mollicoma*. Later (1962) she describes *Hydrozetes dimorphus* from Patagonia. In another article (1966) she also cites collections of *H. lemnae* (de Coggi) from several locations in New Zealand.

From plankton net samples taken in City Park Lake in Fort Collins, in the fall of 1967, I obtained a number of specimens of *Hydrozetes*. This is the first

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species of this particular genus that I have found in the vicinity, as my oribatid collections have been confined primarily to terrestrial habitats. Earlier in the same year, Dr. Ronald O. Kapp, at Alma College, Michigan, had sent me three specimens of an undescribed fossil species of *Hydrozetes* unearthed from peat beds in the Thumb region of Michigan.

Comparing these species with the various species delineated in the literature, I determined that both the fossil form from the peat diggings in Michigan and the species taken from City Park Lake in Fort Collins are new. They comprise the subject of this article and their descriptions follow.

Hydrozetes laccosis, n. sp.

(Figs. 1-5)

DIAGNOSIS: The principal difference between *Hydrozetes laccosis*, n. sp., and other New World forms is that the new species exhibits 16 pairs of notogastral setae (including both C_1 and C_2) compared to 17 pairs in *H. dimorphus* Hammer, 1962, 11 pairs in *H. mollicoma* Hammer, 1958, *H. lemnae* (Coggi) 1898, and *H. petrunkevitchi* Newell, 1945, and 15 pairs of notogastral setae in *H. parisiensis* Grandjean, 1948. The new species seems to be intermediate in length between the smallest representatives of the genus, *Hydrozetes lemnae* (Coggi) 1898 (375 μ -470 μ) and others. It overlaps in measurements with *H. petrunkevitchi* (409-436 $\mu \times$ 270-284 μ) and *H. confervae* (450 μ -560 μ), the next larger species. *H. parisiensis* Grandjean, 1948, ranges from 450 μ -510 μ in length; *H. mollicoma* Hammer, 1958, is 490 μ in length; while *H. dimorphus* Hammer, 1962, shows a differentiation in size between males and females and is the largest species recorded. The males range from 680 μ to 700 μ in length; females from 590 μ to 640 μ in length. The length of *H. incisus* Grandjean, 1948, extends from 515 μ to 600 μ .

The trivial name for the new species comes from the Greek, *lakkos*, implying pond or reservoir, the type of habitat from which the specimens were taken.

DESCRIPTION: Color reddish-brown; prodorsum broadly triangular, rostrum rounded, rostral hairs fine, decurved, inserted in small tubercles slightly less than their lengths from anterior tip; anterior and posterior tatoria forming an inverted "L-shaped" bar mid-way between rostrum and tips of lamellae; lamellae like tapered bars converging behind tatoria, about as wide as width of head of sensillus, tapering anteriorly, without cusps; lamellar hairs twice as long as rostral hairs, fine, decurved inserted in alveolae that are comma-shaped (Fig. 1A); translamella absent; interlamellar hairs shorter than width of lamellae, inserted slightly more than their lengths anterior to pseudostigmata, directed mediad; pseudostigmata at posterior base of lamellae, rounded with slightly erected rims; sensillus slightly curved, capitate with nearly globular head, head shorter than pedicel; pedotecta I and II as in Fig. 1.

Notogaster nearly rounded, dorsosejugal suture arched anteriorly, projection of notogastral margin forming a slight hood anterior to circular ocular area (Fig. 2), anterior notogastral apodematal structures from dissected female as in Fig. 1; anterior margin and shoulders of notogaster with slight tubercles, notogastral hairs as in Fig. 2 (surface of

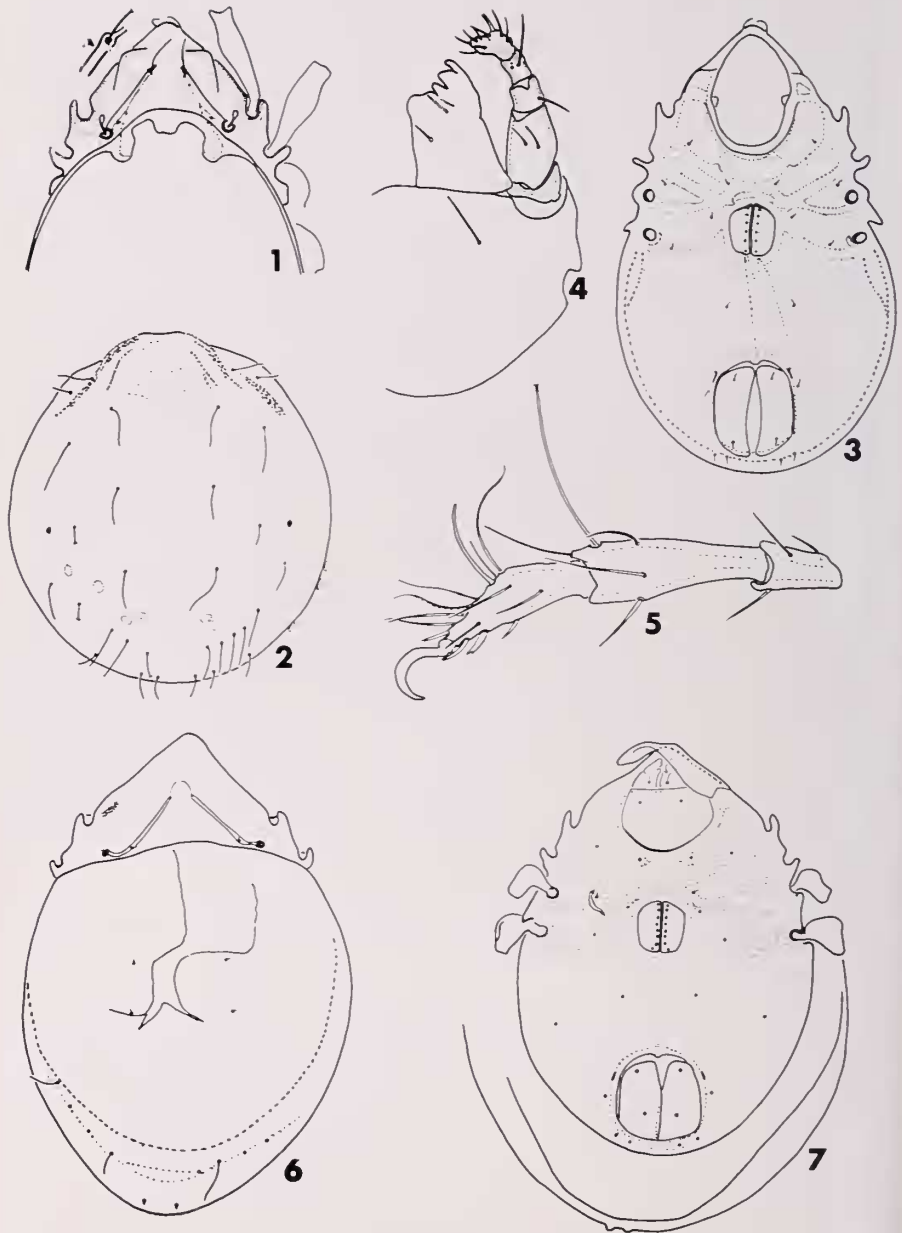


FIG. 1. Pro-dorsum and dorsosejugal apodemes of *Hydrozetes laccosis* from dissected female; A. enlarged view of insertion of lamellar hair and distal lamellar projection.

FIG. 2. Notogastral plate of *H. laccosis* from dorsal aspect showing hairs and slight hood anterior to ocular spot; diatoms adhering to surface; from dissected female.

FIG. 3. Venter of *H. laccosis*, legs omitted, from dissected female.

many specimens with discoid diatoms attached to integument); hairs C_1 and C_2 both present; seta h_1 is missing on the left side in the type specimen.

Camerostome oval in outline; articulating condyles, mentum and submentum as in Fig. 3; palp, mentum and rutellum as in Fig. 4. Ventral setae and apodemata as seen in Fig. 3; genital opening cover with six setae (Fig. 3); anal opening at least twice as large as genital opening, each anal cover with two setae, a:1 in anterior fourth of cover, a:2 in posterior fourth, inserted midway between the margins of cover; fissure *iad* curved, at anterolateral corner of anal opening; adanal setae as in Fig. 3, ada:3 near anterolateral corner of opening, ada:2 and ada:1 posterior to opening, closer to lateral margin.

Legs monodactylous (Fig. 5).

MEASUREMENTS: The type specimen (a female) measured $444 \mu \times 282 \mu$. The other measurable specimens showed a range of 438μ – $486 \mu \times 276 \mu$ – 312μ for females, average $470 \mu \times 300 \mu$; the males ranged 480μ – $486 \mu \times 300 \mu$ – 318μ , average $484 \mu \times 309 \mu$.

COLLECTION DATA: Ten female and 5 male specimens were taken in a plankton net sample at City Park Lake, Fort Collins, Colorado, 30 October, 1967, by T. A. Woolley. The drawings were made from a dissected female.

Hydrozetes oryktosis, n. sp.

(Figs. 6–7)

DIAGNOSIS: Inasmuch as the three specimens of this species are fossil forms from a peat bog in Michigan and the specimens are broken, all characteristics that normally would be compared in a diagnosis were not observable. The principal difference, however, between the new species and extant forms of this genus are the 8 pairs of genital setae and the two pairs of widely spaced aggenital setae present in the fossils. The breakage of the notogaster in each fossil specimen is such that detailed comparisons of the dorsal notogastral hairs is not possible. The trivial name comes from the Greek *oryktos*, implying that these fossils were "dug up." The description that follows is a combination of features exhibited by the three cotypes collected from the peat.

DESCRIPTION: Color yellowish-brown, integument finely stippled in all specimens; prodorsum broadly triangular, rostrum rounded (Fig. 6), rostral hairs not visible; tutoria indiscernible in specimens because of breakage; lamellae narrow, converging ridges, connecting to pseudostigmata, extended medially and anteriorly from pseudostigmata; lamellar hairs fine, decurved, at least three times as long as interlamellar hairs, inserted in distal tips of lamellae; interlamellar hairs very fine and short, shorter than width of lamellae, inserted in medial edge of lamella near pseudostigmata; pseudostigmata rounded, connected

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FIG. 4. Palp, rutellum and part of mentum of dissected female of *H. laccosis*.

FIG. 5. Genu, tibia, tarsus I of *H. laccosis*.

FIG. 6. Dorsum of fossil *Hydrozetes oryktosis*, broken notogaster. Drawing of cotype specimen (A) female.

FIG. 7. Venter of fossil *H. oryktosis*, drawing of cotype specimen (B), notogastral plate displaced posteriorly and showing two projections.

to base of lamellae by a short, slightly curved ridge; pedicel of sensillus broken, head of sensillus absent.

Notogaster rounded; notogastral hairs and/or alveolae as indicated in Fig. 6.

Camerostome broadly triangular; mentum and rutella with hairs, ventral setae and apodemata as seen in Fig. 7; genital opening nearly square, each genital cover with 8 setae along medial margin; g:8 displaced more laterally than other setae; insertions of two pairs of widely spaced aggenital setae apparent in venter posterolaterad of opening (Fig. 7); anal opening at least twice as large as genital opening, each anal cover with two setae, a:1 in middle of anterior part of cover, a:2 posteriorly placed in cover and nearer medial margin; fissure *iad* near anterolateral margin of anal opening, margin formed as sclerotized ring with preanal piece coalesced; adanal setae *ada*:3 at level of middle of anal cover each side of anal opening, *ada*:2 at posterolateral corner of cover, *ada*:1 posterior to anal cover (Fig. 7).

The legs of each of the three cotypes are broken and missing leaving only the femora showing in some instances. Since all of the other characteristics indicate the genus *Hydrozetes* it is assumed that the legs in this instance were also monodactylous, though this must remain a supposition, when compared with extant forms.

MEASUREMENTS: Each of the cotype specimens is somewhat flattened which may distort the accuracy of the measurements, but the lengths and widths for each specimen are as follows: A. $420\ \mu \times 306\ \mu$ (female), B. $408\ \mu \times 300\ \mu$ (male?) and C. $408\ \mu \times 288\ \mu$ (female).

COLLECTION DATA: Three specimens, two females and one male (?), were taken in peat, SW corner S 21, T 10 N, R 11 E, Lapeer Co., Michigan, by R. O. Kapp. The three cotype specimens will be deposited in the U. S. National Museum.

DISCUSSION

The three fossil mites were recovered from peaty sediments by Dr. Ronald O. Kapp while screening for plant macrofossils. He mounted the specimens in glycerin jelly and sent them to Dr. Robert Beer at the University of Kansas for identification. They were referred to me by Dr. Beer.

To quote from Dr. Kapp's letter to Dr. Beer: "The excavation of the site is under the direction of Dr. Warren Wittry, Director of the Cranbrook Institute of Science, Bloomfield Hills, Michigan. The site is especially significant because there seems to be conclusive evidence that the mastodon was 'butchered' or at least 'salvaged' by the Paleo-Indians on the scene. All except 3 or 4 bones has been recovered."

At the site the mites were recovered "in peat near base of about 13 inches of peat and buried approximately 25 inches below the present surface of the soil slightly older or about contemporaneous with fossil mastodon specimen (*Mammot americanus*)."

In another letter Dr. Kapp adds, "The material was extracted from calcareous silty clay beneath peat and about 12-14 inches below the 10 inch zone of agricultural tillage."

"It is clear that the age of the mites is $10,750 \pm 400$ years BP. . ." based on C-14 dates of this and stratigraphically higher levels (M-780 and M-1781, University of Michigan C-14 Lab).

Not too much recent ecological information is available on species of *Hydrozetes*. Following is a brief summary of what is available.

In addition to the taxonomy of North American species of *Hydrozetes*, Newell (1945) describes them as usually living on completely submerged fresh-water plants, but some occasionally are found on plants at the surface. One or more are terrestrial, living among wet leaves. It is in this same article that Newell describes the ability of *Hydrozetes* to form a bubble of gas in the mid-gut and decrease their density sufficiently to rise in a column of water. He also found that these mites respond to different intensities of light during this levitation process.

Grandjean's article (1948) does not describe any ecological data concerning *Hydrozetes*; it is mainly concerned with taxonomic features of the mites he collected in the environs of Paris.

Hammer (1962) discusses the collection of *Hydrozetes dimorphus* on the beach of Lago Moreno in 2 cm high moss and associated with *Scirpus*, *Ranunculus*, besides a little *Salicornia* on wet black soil. She mentions that several specimens were taken in nearly similar bio-types with almost homogeneous vegetation of *Salicornia* and others richer in *Ranunculus* and *Scirpus*; in all about 40 specimens of *Hydrozetes dimorphus* were found. In 1966 she reported on the collecting sites of several specimens of *Hydrozetes lemnae* (de Coggi): "One specimen in wet moss on a stone in a brook, another in moss on the edge of a swamp, another specimen in *Selaginella*, numerous examples in wet moss on a stone on the edge of a pond and a few individuals in wet moss, *Lemna*, water cress on the edge of a spring"; near Queenstown, New Zealand, she found a few individuals in soaked moss on the bank of Lake Hayes.

Not much is added to the ecological data on *Hydrozetes* by this present article other than a new species from a new location in North America. The "accidental" recovery of these mites in plankton samples, however, may alert collectors as to how to obtain them and may stimulate specialists in the oribatids to be more on the lookout for *Hydrozetes* in their collecting.

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ERRATA

In the article by C. F. dos Passos, "*Lethe eurydice* (Johansson) and *L. fumosus* (Leussler) Sibling Species (Lepidoptera: Satyridae)," which appeared in the June, 1969 issue of the **Journal** (**77**: 117-122) *fumosus* should read *fumosa* throughout the paper. Also, on p. 120 Sarky County should read Sarpy County.

and

In the article by P. P. Shubeck, "Ecological Studies of Carrion Beetles in Hutcheson Memorial Forest," which appeared in the September, 1969 issue of the **Journal** (**77**: 138-151) in the last line of the Abstract the word *most* should read *least*.